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United States Patent [19]

Mezzatesta, Jr. et al.

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[54] **CONTROL SYSTEM FOR REGULATING MOTOR SPEED**

[75] Inventors: **Frank Mezzatesta, Jr.,** Glendale; **Donald M. Young,** Los Angeles, both of Calif.

[73] Assignee: **The Walt Disney Company,** Burbank, Calif.

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Related U.S. Application Data

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[52] U.S. Cl. 318/268; 318/434; 318/464; 388/903; 388/909

[58] Field of Search 318/565, 652, 653, 640, 318/647, 463, 254, 590, 602, 618, 135, 138, 139, 268, 271, 272, 434, 439, 464, 490, 494, 495, 496; 388/809, 814, 816, 820, 903, 907.5, 909

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Primary Examiner—Bentsu Ro
Attorney, Agent, or Firm—Pretty, Schroeder, Brueggemann & Clark

[57] **ABSTRACT**

A motor control system accurately and reliably controls the speed of a motor so that the motor operates in accordance with a predetermined motor speed profile, and therefore does not exceed a predetermined safe speed, decelerates at a controlled rate, maintains a safe minimum speed, and does not turn in reverse. If the motor operates out of these limits, a malfunction is indicated and the control system halts operation of the motor. The motor speed is determined using an electronic tachometer that analyzes the current in at least two phases of the motor to provide extremely precise and reliable velocity information for the motor.
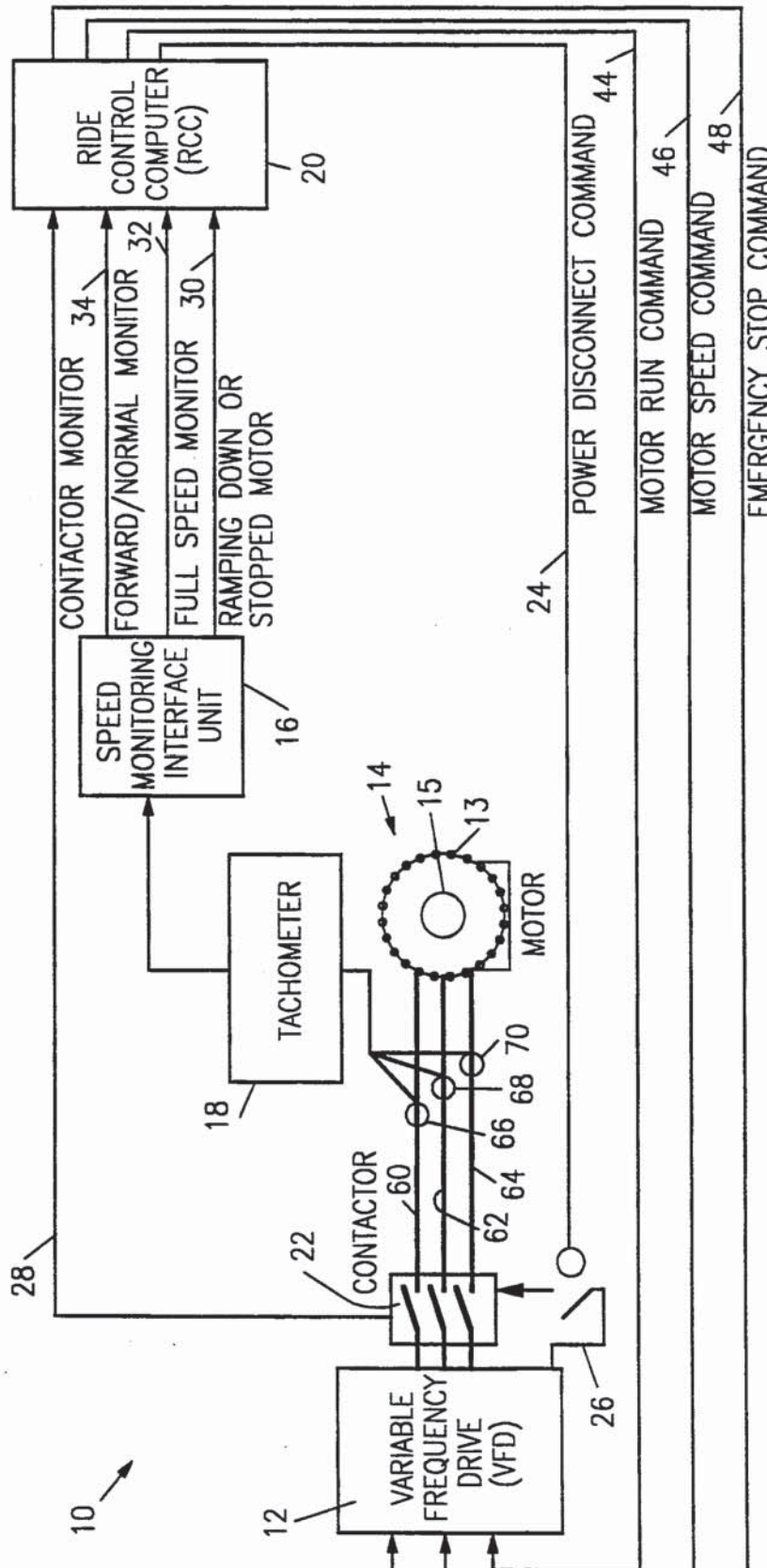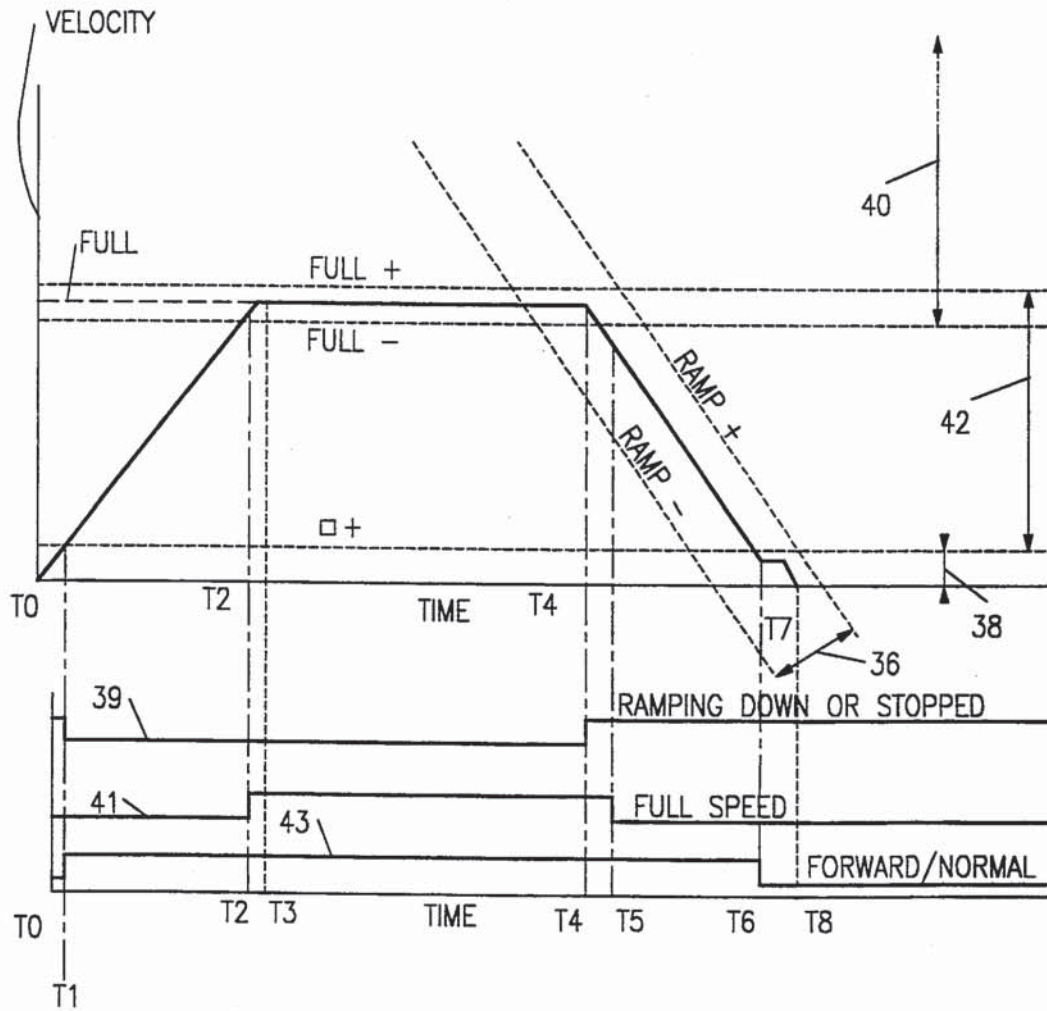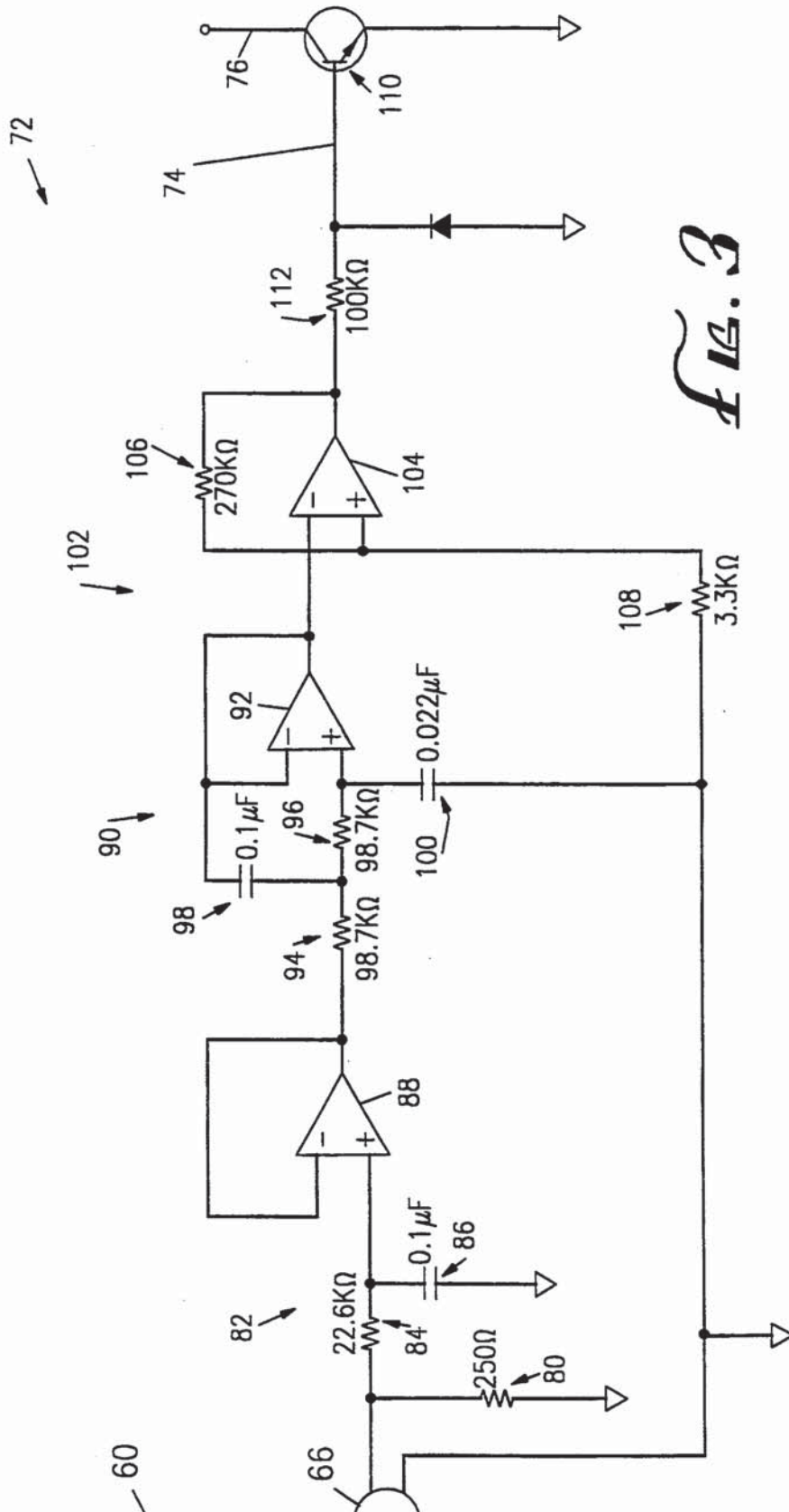
20 Claims, 4 Drawing Sheets

Fig. 1

FIG. 2

Fig. 3

RIDE CONTROL COMPUTER (RCC) 20

CONTACTOR MONITOR 34

FORWARD/NORMAL MONITOR 32

FULL SPEED MOMITOR 30

RAMPING DOWN OR STOPPED MOTOR

SPEED MONITORING INTERFACE UNIT 16

214

215

213

24

POWER DISCONNECT COMMAND 44

MOTOR RUN COMMAND 46

MOTOR SPEED COMMAND 48

EMERGENCY STOP COMMAND

TACHOMETER

18

270

268

266

264

262

CONTACTOR 260

22

28

26

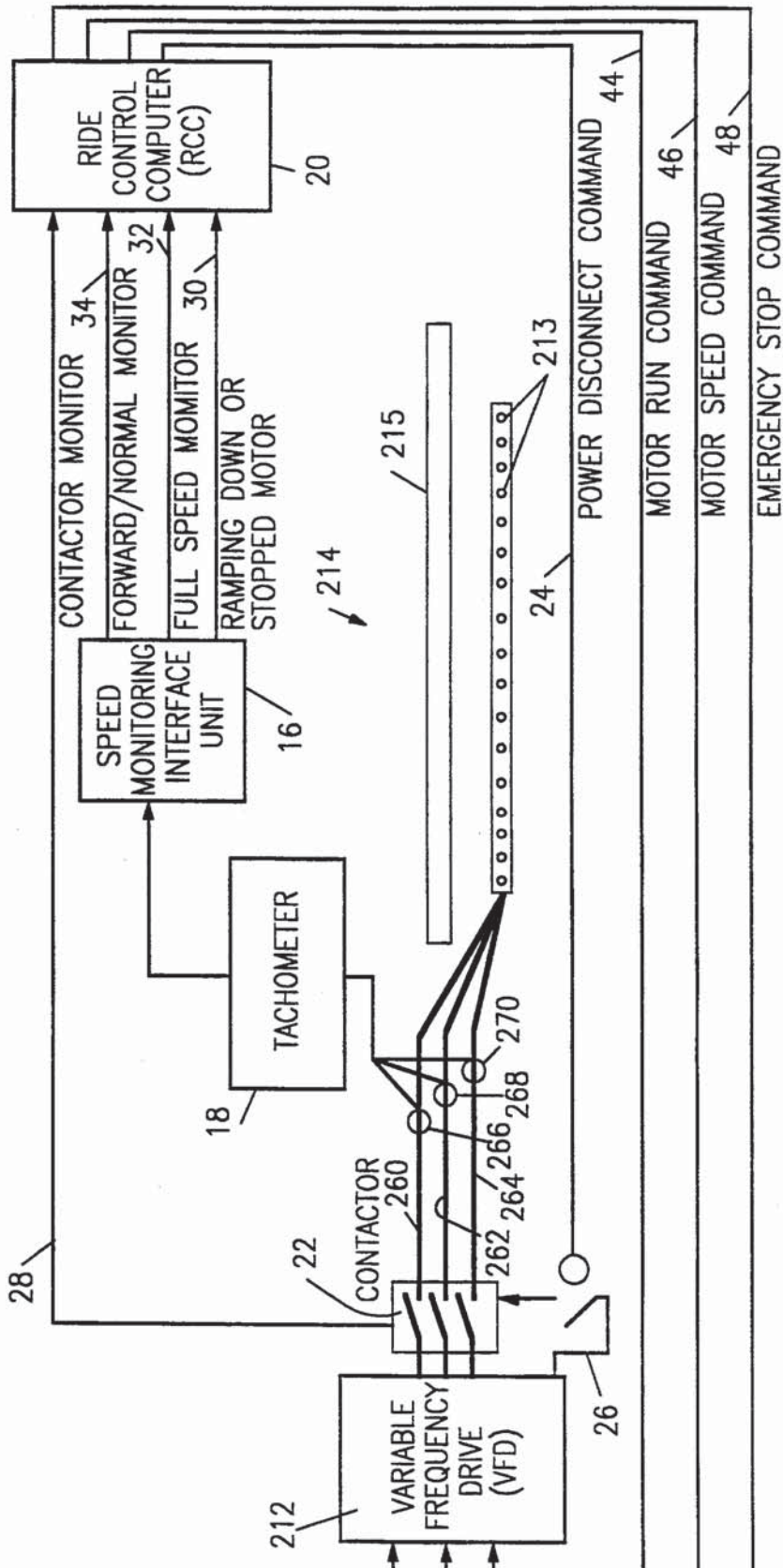VARIABLE FREQUENCY DRIVE (VFD)

212
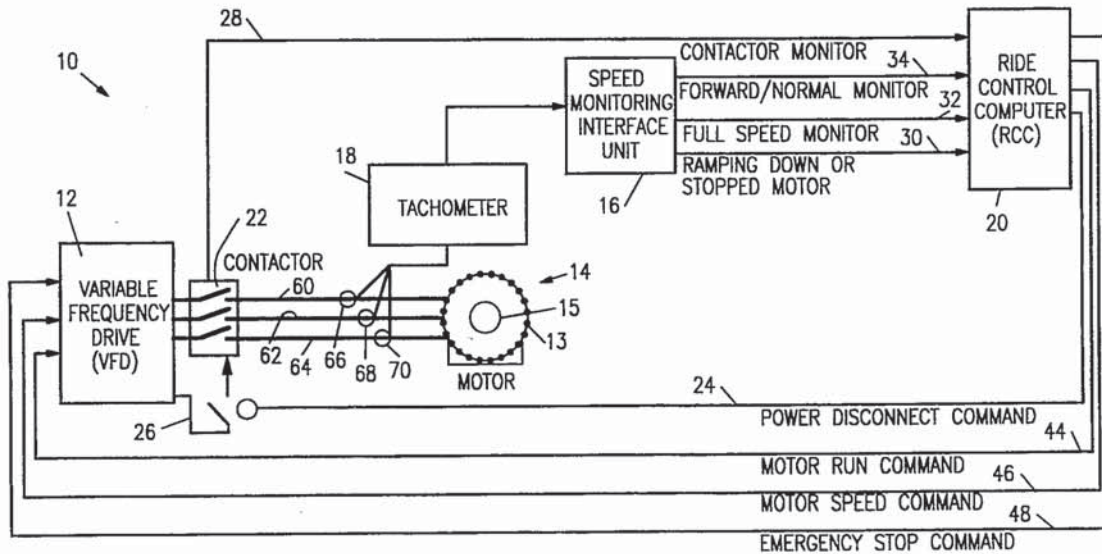
Fig. 4

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